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THE INFLUENCE OF THE PRESENT METHODS OF GRADUATE INSTRUCTION ON THE TEACH- ING IN SECONDARY SCHOOLS¹

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The secretary of this association when he assigned me this subject instructed me to present a brief paper which might form the basis for a general discussion rather than a somewhat lengthy one dealing with the various phases of this interesting topic more in detail. I will endeavor to follow these instructions as best I can.

The influence of our colleges, through their requirements for admission, upon the curriculum and the teaching in our secondary schools has been very great in the past and is still quite marked. To the colleges must be credited very largely the establishment of laboratories in our secondary schools and the consequent reform in the teaching of the natural sciences. The colleges have also in recent years greatly stimulated the study of English and of the modern languages in these schools. That this "domination of the college," as it is termed, is, however, not always wholesome, is indeed, in some respects to a marked degree harmful, is a familiar fact; but I take it that this is not a part of the topic under discussion.

¹ Paper read before the annual convention of the Association of Colleges and Preparatory Schools of the Middle States and Maryland, held in New York City, November 29 and 30, 1907.

What is the influence of present methods of graduate instruction on the teaching in secondary schools?

The main function of the graduate schools in American universities, as indeed also in those of Europe, seems to be to train teachers for the universities, the colleges, and the secondary schools. Are the methods of instruction in these graduate schools as effective in training teachers for the secondary schools as they confessedly are in training teachers for the universities? Or do the general aims of these three types of institutions, and the degree of maturity of their students, require each a somewhat different training for its teachers? In what respects does the present training in our graduate schools meet the special demands of teachers in our secondary schools and in what respects does it fail to do so? These seem to be the questions suggested by our subject.

Comparatively speaking, only a few teachers now teaching in secondary schools have done any graduate work at all. But there is no doubt that the effect of such graduate work upon those who have enjoyed it has been to elevate their ideals of scholarship, to give them a more thorough grasp of the subjects which they are teaching, and to develop in them more strictly scientific methods of study than mere collegiate training can give. But does it adequately fit them to present the subjects of the secondary-school curriculum as they should be presented to the relatively immature minds of the boys and girls who attend these schools? If not, wherein lies its weakness and what is the remedy?

I will try to suggest tentative answers to these questions as a basis for fuller discussion, and I will do so briefly and—for the sake of brevity—dogmatically.

1. The best graduate schools in this country as in European countries make it their chief aim to train the student in methods of scientific research, and require of him a thesis for the Doctor's degree which shall not only prove his familiarity with scientific method but shall also make an original contribution to human knowledge. It is quite true that this ideal is frequently not realized, yet it determines the method of instruction; and it

makes it necessary for the student to confine his special investigation to a very limited portion of a single science.

It is a commonplace to say that the thorough investigation of a single problem in any science necessarily touches upon many phases of that science and upon related sciences; yet such study of the broader field of science is only incidental to the particular problem to be investigated by the student, does not give a true perspective of the field as a whole, and does not arouse an interest in it. Such thorough training in a limited field, involving a high degree of specialization, is just the training required to fit the student for the position of teacher in a university and of the upper classes in a college, but it fails to give that broad interest in and mastery of a group of related sciences which fit a teacher to do effective work in any one of them in a secondary school. In our large city high schools specialization among teachers has already gone too far. It has the effect of narrowing their interest and finally their scholarship; for in a secondary school the treatment of all subjects must be quite elementary, and the relations between the various subjects must be constantly brought out. A teacher of physics should be prepared also to teach chemistry, geology, and astronomy; a teacher of Greek or Latin should be prepared to teach either language, and also Greek and Roman history. He will teach these languages the better if he also teaches classical history, which will enable him to give the historic setting of the literature which he is reading with his classes. It has been said that George Washington to many people is nothing but a steel engraving; we must see to it that in teaching Latin Caesar is not merely a book called the *Gallic War* and Cicero a certain number of orations.

2. The highly specialized training of the best graduate schools seems to make it difficult for the young teacher to view his work from the standpoint of his pupils rather than from that of his subject. It is absolutely necessary that the chief interest of the teacher in a secondary school be in his pupils rather than in his subject; and the perennial source of interest in secondary-school work must be in the new problems which each new class,

and indeed each new pupil, presents more than in any researches which the teacher has the time and strength to make in his special field. A teacher in a secondary school whose deepest interest is in his subject will find, after a series of years, secondary-school work exceedingly disappointing and uninteresting. Such work is altogether too elementary to be a permanent source of inspiration from the standpoint of scholarship, and it is altogether too taxing on one's strength, because of its amount, to make it possible privately to pursue one's specialty in its higher departments. A teacher who is required to teach Latin or mathematics for five hours during the day is not likely to read Tacitus or study the calculus in the evening for pleasure. In short, in the secondary school, as in the elementary school, the teacher's interest must be in his pupil more than in his subject, and it would be well if this were more the case in our colleges than it is; while in the university, where the student is mature and is prepared for advanced specialized study, the interest of the teacher may well be chiefly in his subject.

3. To the immature mind interest in natural science, and to a large extent in mathematics, lies not in the pure science but in the applications of the science to the phenomena of nature and to our industrial and social life. The establishment of laboratories in our secondary schools, while it was a great step in advance, has not developed after all an interest in science to the extent it was hoped it would. Compared with the total attendance, the classes in physics in our public high schools are phenomenally small and have been decreasing for a series of years. Biology has never been a popular study. The classes in chemistry are also relatively small. Now the natural sciences are intrinsically interesting to pupils of the secondary-school age if well taught; and when they are not, the teaching is at fault. In our laboratories the pupil makes his experiment, observes the result, formulates a generalization, and writes it in a notebook. That, in most cases, is the end of it. He does not know what his generalizations mean beyond the fact that they seem to explain the phenomena observed in the experiment, and these phenomena are neither intrinsically interesting nor excep-

tionally important to him. If, on the other hand, the teacher would take these laws and principles formulated in the laboratory out of doors and lead the pupil to use them as a key to unlock the mysteries of physical nature and of life, they would acquire a meaning for the pupil and an interest which they cannot possibly have as mere generalizations. There is more educational value, to an immature mind at least, in knowing one principle in physics and seeing fifty applications of it in the interpretation of the phenomena of nature or the facts of life than in knowing fifty principles as mere generalizations of the laboratory. There is no reason, for example, why in physics the whole of meteorology in its elements should not be taught, for it is little else than applied physics. In like manner chemistry should be taught in its application to everyday life; and biology should be treated in a way to show its practical application to agriculture, the industries, and to the problems of personal and public hygiene.

In short, the sciences should be taught as applied sciences to beginners in secondary schools for the purpose of arousing a deep interest in them; in college and the university they may be taught in their more abstract form as pure sciences; and in the higher technical school they must necessarily again be taught as applied sciences for practical reasons.

In like manner mathematics can be made to appeal to pupils of secondary schools much more strongly if the application to the conditions of life are emphasized at every point, before they are studied in their abstract or pure form. The present movement among teachers of physics and also among teachers of mathematics to make these studies more real and more vital in secondary schools by relating them to life is one of the most hopeful movements in secondary education that has developed in recent years.

Now, my contention is that the graduate instruction in our universities does virtually nothing to fit a teacher to teach either science or mathematics in this vital way in secondary schools. It may even be possible that the highly specialized training of the graduate school, to a certain extent, unfits the student to do

this sort of teaching. However that may be, I state a well-known fact when I say that not one in fifty of the men and women who take the Doctor's degree in science or in mathematics has the least conception of the problem before him when he begins teaching in a secondary school.

4. In literature the training in our graduate schools is too analytical, too philological and critical to give a student the best preparation as a teacher in a secondary school. In this respect the training in our graduate schools, together with the requirements of admission to our colleges, largely vitiates the teaching of English in our secondary schools. It is true that the colleges and universities have aroused a deeper interest in English in secondary schools, but they have done virtually nothing to point out a better method. We might say in a general way that the methods of the university and of the college have got into our secondary schools and vitiated the teaching of English. These methods are not always good even for college and university students, and they are very generally bad for secondary-school boys and girls.

Literature is essentially art, and it must be taught as art. It must be made to appeal powerfully to the imagination and to the emotions; it must hold up before the pupil's mind right ideals of life, must interpret life to him, and must minister to his spiritual development. Indeed, in its higher functions it is closely allied to religion as a factor in the pupil's spiritual growth.

Now, literature cannot be made to appeal to the pupil in this way when treated analytically, philologically, or critically. To treat a work of art in this way in presenting it to immature minds is to destroy it as a work of art. We do not get the meaning of the Venus de Milo or the Apollo Belvedere by making a chemical analysis of the marble, nor the meaning of sorrow by knowing the chemical ingredients of tears and the physiological mechanism of the sigh.

To present literature in this vitalizing way it is above all necessary that the teacher be a person of artistic rather than scientific temperament. As the scientific temperament is usually unfitted to produce literature, so it is generally unfitted to teach

it; and when a person attempts to teach literature in a secondary school, as sometimes happens, who is neither scientific nor artistic in his temperament, it is much easier to foretell what he will not do than what he will do. He who has no poetry in his own soul cannot make poetry vital in the life of others.

In the next place, the interpretation must be artistic, not scientific; it must be concrete, must present living wholes, not dissected parts. The most effective interpretation of literature is the artistic oral reading of it, and every teacher of literature in a secondary school should be a good reader. Literature should be so taught as to create a deep love for it. Analytical and critical methods do not accomplish this in secondary schools. Even in our adult years when we wish to read for pleasure we instinctively avoid the school editions of the English classics with their pedantic, impertinent footnotes.

While I am not competent to criticize in detail the teaching of literature in our graduate schools, I know that the teachers trained in these schools do not as a rule teach literature as art when they begin work in secondary schools; they emphasize altogether too much the critical, analytical, and historical phases of the study to make it mean what it should to boys and girls in their teens.

This treatment of literature involves necessarily also the careful selection of what is to be read with special reference to the needs of immature pupils. This is a matter which it may not be the province of the graduate school to deal with, as it is primarily a pedagogical problem; and yet the graduate school might at least impress upon the student who is to go into secondary-school work the importance of the problem, and the college might help to solve it by prescribing the right kind of literature in its admission requirements. It is difficult to determine on what principles much of the English now prescribed by the colleges for secondary schools is selected except that it must be out of copyright and must lend itself readily to examination purposes.

What are the remedies?

I venture to suggest, in a purely tentative way, the following as possible but perhaps only partial remedies.

1. The graduate school might make a distinction between two classes of students—those who are fitting themselves to teach in universities and colleges, and those who are preparing to teach in secondary schools. The former might be required to limit their study to a narrow speciality, to carry on an exhaustive research, and to produce a thesis which not only shows a mastery of scientific method but also gives evidence of productive work and makes a contribution to the science to which it relates. The latter might be allowed to work in a broader field, to acquire a fair mastery of several related sciences, without being required to specialize narrowly, and be permitted to present a thesis which gives evidence of their having made themselves familiar with the methods of research in the subjects which they expect to teach without requiring them to make any strictly original contribution to their speciality.

No university lives up to its ideals to the extent of requiring in all cases an original contribution to science for the doctorate. The number of brilliant discoveries made by young doctors of philosophy is remarkably small. What I am advocating is therefore not a lowering of the present standards of graduate work, but rather a frank recognition of these standards as they actually exist, and an intelligent discrimination between these two classes of students.

If it should be objected that this would make the promotion of teachers from secondary schools to universities very difficult, it might be said in reply that such promotions are so rare in this country, and in Europe as well, that this is a wholly secondary consideration.

2. The treatment of literature as art in our graduate schools, at least in the case of students who wish to fit themselves for positions in secondary schools, might profitably be emphasized more than it is.

3. It would probably not vitiate, much less contaminate, as some persons imagine, the teaching of pure science and pure mathematics in our graduate schools, if some considerable em-

phasis were laid incidentally upon their application, at least in the training of teachers for secondary schools.

4. As a student and teacher of pedagogy I am probably far from impartial when I suggest that the most important remedy would be to oblige every student in a graduate school who wishes to teach in a secondary school—or in a college—to study education both as a science and as an art, and make himself familiar with the best methods of teaching the subject which he is fitting himself to teach. In Prussia such training is a universal requirement of all candidates for positions in secondary schools, and the day is not far distant when the same requirement will be made in the progressive states of this country. The rapid development of departments of education and schools of education in our colleges and universities indicates that there already exists a wide recognition of the need of such training. Many teachers in colleges and universities have, however, in the past, not looked with much favor upon the department of education, and some of them still view it with a certain misgiving such as one naturally feels in the presence of the unknown; but more light is also bringing more sweetness, and their attitude is becoming steadily more friendly as these departments are growing in efficiency and in strength.